Reports

BIOLOGICAL EVALUATION OF THE ASH BORER

JEFFERSON NATIONAL EXPANSION MEMORIAL NATIONAL HISTORIC SITE 1982

by
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INTRODUCTION

The Jefferson National Expansion Memorial National Historic Site (the Site) is managed by USDI National Park Service. The Site, located in St. Louis, MO, includes the old Courthouse, memorial park and the Great Arch on 90 acres of land.

Several tree species have been planted on the Site for decorative purposes. One species, white ash (Fraxinus americana L.) 'Rosehill' is widely planted along an extensive network of concrete walks. All the ash trees are grafted stock. Of the nearly 1,000 Rosehill ash trees, about a third are planted in the walks, but are surrounded by 4 ft^2 iron grates. The remaining ash are planted in the lawn. Soil throughout the Site is a heavy clay loam on the surface with a conglomerate of fill for subsoil. This soil is severely compacted by the millions of visitors to the Site. The ash trees were planted as saplings; at that time, they were about 2 inches in diameter (collar caliper) and 10 feet tall. Plantings were done during the last four years. These trees now vary in size from 2 to 5 inches dbh and 10 to 25 feet in height. Spacing between trees is 25 feet. There are three rows of trees along some walks and four rows along other walks.

OBJECTIVE

The objective of this biological evaluation was to determine the extent and intensity of an ash borer (Podosesia syringae (Harris)) infestation and to develop an intergrated pest management plan to prevent further borer damage to the Rosehill ash planted on the Site.

METHOD

Nancy Baker, Horticulturalist at the Site, and I examined about half the Rosehill ash in March 16, 1982. The trunks between the lowest branches and the root collars were covered with tree wrap paper. Paper was removed from about 20 ash trees to allow examination of the bark for new

and old borer damage. Trunk areas at the branch junctions were also examined for borer damage.
The ash borer uses the tree wrap as it does tree bark - it makes an exit hole then covers it with a mixture of chewed wood and webbing. This hole cover indicates a live ash borer is in diapause just inside the bark. Using these hole covers as indicators, we examined 100 ash trees in four groups for presence of current borer populations.

RESULTS

Nearly 60 percent of all Rosehill ash on the Site had old borer attack scars. The attacks were most prevalent at the junction of branches with trunks and could be found anywhere on the trunk between the branches and ground level.
Nineteen percent of the ash trees supported living ash borer larvae. The percentage varied from five percent to 28 percent, with the newest plantings at the low end of the range. This infestation level is extremely high - a three percent infestation level is commonly considered normal in green ash planted in shelterbelts.

CONCLUSION

The Site is highly conducive to ash borer attack because of heavy soil, soil compaction, and a planting design which calls for open grown trees. Ash borers have found the Site a favorable habitat and have increased in population to levels that render ash trees highly sueceptible to invasion by beetles and carpenterworms as well as to breakage from wind or glaze storms. A pest control plan needs to be activated and maintained to prevent tree damage.

MANAGEMENT OPTIONS

The following options, or combinations thereof, can be considered for use in controlling the ash borer on the Site:

1. Remove all the ash trees and replace them with other species that are resistant to ash borer.
2. Spray ash tree trunks and branches more than 2 inches in diameter with Dursban® 2E at the rate of 2 fl. oz. plus water to make 3 gal. of formulation. Apply to trees within 7 days of first moth flights in mid-April and again two to three weeks later. This operation will probably need to be done each year or alternate years as long as the trees are present. Each year of spraying will require more spray than the previous treatment because trees become larger. Lindane is also registered for ash borer, but it is not readily available. Treatment would be the same as for Dursban.
3. Do no treatment. Allow the ash borer to attack at will then when ash trees break or die, replace them with other species. Natural enemies will not control ash borer. In shelterbelts, woodpeckers contribute 61 to 83 percent of control, ants 7 percent, and three species of wasps about 6 percent. Woodpeckers need large trees for

cavity nest sites and therefore cannot be depended upon at the Site to eat ash borers.

4. Use pheromone mimics to confuse male adult ash borers so that mating is disrupted and only infertile eggs are deposited. The pheromone or sex attractant (Z,Z)-3, 13-octadecadien-1-ol acetate is available on caps or 1 inch by 2 inch lures that may be placed in trees. One lure or cap tacked or tied to each tree may be sufficient to disrupt mating, but it will also "call in" males from outside the Site. Pheromones need to be in place from mid-April to the end of July every year. Efficacy of this method is not known.

5. Use a 6 inch piece of 16 gauge wire to probe exit holes made by ash borers. The probing will puncture overwintering larvae if this is done in March when the insects are near their exit holes. The holes are difficult to see on the bark and will be equally difficult to reach as the trees grow. Borer exit holes can be found as high as 40 feet above the ground in large trees. The damage by borers is done by the time probing is completed; and although populations are reduced, new borers will invade the Site. This type of effort will kill a small proportion of the larvae.

6. Saturate the Site with sticky traps baited with sex attractant to capture male moths. The paper or plastic traps, about the size of a shoe box, are a manufactured product that are hung in ash trees about 3 to 8 feet above the ground. They should be in place by mid-April. Traps must be checked every week to replace the sticky bottom portion that may be covered with male moths. Vandalism would be a serious problem. Traps surviving the summer can be removed in late July and used in subsequent years with fresh sticky bottoms and lures or caps. This treatment should be used every year. Efficacy of saturate trapping is unknown.

RECOMMENDATION

It is recommended that portions of the options be used in an integrated pest control program to keep borer damage at an acceptable level. A complete intergrated pest management plan is not an option because the tree species, the planting design, and the soil all contribute to a constant high population of ash borer. A primary and expensive effort in 1982 followed by an annual or biennial maintenance is recommended. Depending upon borer population levels, various portions of the alternative may have to be implemented in subsequent years. The following procedure is the basis of the control program:

1. March, 1982. Use the probe wire system to kill overwintering larvae. Remove tree wrap after probe control.

2. Early April, 1982. Hang pheromone sticky traps in each ash tree in the middle row of three-tree plantings and in every other tree in the second and third rows of four-tree plantings. Check the traps weekly and replace trap bottoms when they are crowded with male moths. Tack lures or caps in all ash trees that do not support

a trap. One lure per tree, on the trunk, at 8 feet above the ground will be plenty to disrupt mating.
3. Late July, 1982. Remove traps and lures.
4. Early September, 1982. Check trees for sawdust from boring holes. This can be done only if there has been no rain for about seven days because rain washes away the boring dust. Timing of the check is less critical than finding the sawdust. Apply Dursban in water with a wash bottle or oiler can to the holes emitting sawdust. One short squirt will suffice. Two ounces of Dursban should be enough to treat all the boring holes.
5. November, 1982. Put paper tree wrap on all ash trees to prevent forest cracks which serve as excellent oviposition sites for ash borer. Prune broken branches.
6. March 1983. Repeat step one.
7. Early April, 1983. Tack lures in every ash tree as in step 2, and hang 12 to 15 traps throughout the Site. Check traps weekly to determine abundance of male moths.
8. Late July, 1983. Remove traps and lures.
9. August, 1983. Check trees for sawdust around boring holes. If active boring population is present, prepare to apply Dursban in early September as done in Step 4. If no borers are present, wait until April to put up 12 to 15 traps to sample borer populations.
10. November, 1983. Repeat step 5.
11. March, 1983. Use wire probes to kill larvae, then remove tree wrap. The wrap will not be needed in subsequent years except on new plantings.
12. August, 1984. Repeat step 9.
13. April, 1985. If it is necessary to put up traps as a result of high borer populations detected in August, 1984, 15 traps with a summer's catch of 30+ male moths will indicate the need for Dursban treatment in September. If male moth catches are very high, it will be necessary to return to intensive trapping, mating disruption, and Dursban treatment of boring holes. If populations remain low, an annual maintenance program of 12-15 traps and a cleanup of occassional boring holes with Dursban should prevent intolerable damage.

Forest Pest Management Entomologists are available for further evaluation of pest problems and for technical assistance in suppression activities.

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